## **ELECTRONIC INFORMATION DISCLOSURE STATEMENT**

Electronic Version v18

Stylesheet Version v18.0

Title of Invention

METHOD AND STRUCTURE FOR IMPROVING CMOS DEVICE RELIABILITY USING COMBINATIONS OF INSULATING MATERIALS

**Application Number:** 

Confirmation Number:

First Named Applicant:

Haining Yang

Attorney Docket Number:

FIS920040194US1

Art Unit:

Examiner:

Search string:

(5851893 or 6724053).pn

## **US Patent Documents**

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
imi	1	5851893	1998-12-22	Gardner et al.		438	305
smi	2	6724053	2004-04-20	Divakaruni et al		257	402

## **Signature**

Examiner Name	Date
T. M. Thomas	10-31-05

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Sheet 2 of 3 Serial No. File No. U.S. DEPARTMENT OF COMMERCE **FORM PTO 1449** PIS920040194US1 10/711,897 PATENT AND TRADEMARK OFFICE (REV 2-32) INFORMATION DISCLOSURE STATEMENT BY APPLICANT Applicant(s): Haining Yang et al. (Use several sheets if necessary) Filing Date: Group: 10/12/2004 U.S. PATENT DOCUMENTS PILING DATE IF DOCUMENT EXAMINER SUBCLASS CLASS APPROTRIATE NUMBER NAMB INTIAL 06/06/1996 763 05/27/1997 Brigham et al. 438 5,633,202 08/22/1997 257 751 12/08/1998 Trivedi et al. 5,847,463 13 09/25/1997 257 649 Wang et al. 03/21/2000 6,040,619 14 257 640 01/31/1997 Brigham et al. 6,046,494 04/04/2000 15 438 437 07/10/1998 11/14/2000 Kuehne et al. 6,146,975 16 11/17/1999 6,214,733 B1 04/10/2001 Sickmiller 438 691 17 06/08/1999 740 6,228,777 B1 438 05/08/2001 Arafa et al. 18 430 01/21/2000 438 6,261,924 BI 07/17/2001 Mandelman et al. 19 438 591 01/05/1999 6,306,742 B1 10/23/2001 Doyle et al. 20 06/20/2000 438 05/28/2002 21 6,395,610 B1 Roy et al. U.S. PATENT APPLICATION PUBLICATIONS FILING DATE IP EXAMONER DOCUMENT NAME SUBCLASS. NUMBER DATE APPROPRIATE INTUAL FOREIGN PATENT DOCUMENTS FILING DATE IF DOCUMENT EXAMINER SUECLASS APPROPRIATE DATE COUNTRY CLASS NUMBER INITIAL OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Patents, etc.) Date considered Examiner 10-31-05 M. Thomas EXAMINER: Initial if citation considered, whether or not citation is in conformance with M.P.B.P. 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Sheet 3 of 3 Serial No. File No. U.S. DEPARTMENT OF COMMERCE **FORM PTO 1449** 10/711,897 FIS920040194US1 PATENT AND TRADEMARK OFFICE (REV 2-32) . INFORMATION DISCLOSURE STATEMENT BY APPLICANT Applicant(s): Haining Yang et al. (Use several sheets if necessary) Group: Filing Date: <del>2811</del> 2822 10/12/2004 U.S. PATENT DOCUMENTS FILING DATE IF DOCUMENT EXAMINER SUBCLASS APPROPRIATE CLASS NUMBER DATE NAMB INITIAL 03/30/1999 777 08/20/2002 Ramkumar 438 Im. 6.436,848 B1 627 12/07/2000 257 Shimizu et al. 11/05/2002 6,476,462 B2 23 438 261 06/20/2000 6.509,230 BI 01/21/2003 Roy et al. 24 02/28/2001 644 257 6,515,351 B2 02/04/2003 Arafa et al. 25 09/16/2002 626 438 6,573,172 B1 06/03/2003 En et al. 26 12/12/2002 336 257 Chidambarrao et al. 11/30/2004 27 6,825,529 B2 U.S. PATENT APPLICATION PUBLICATIONS BILING DATE IF DOCUMENT EXAMINER SUBCLASS, APPROPRIATE DATE NAME NUMBER INITIAL FOREIGN PATENT DOCUMENTS FILING DATE OF DOCUMENT EXAMINER SUBC) APPROPRIATE DAT COUNTRY NUMBER INITIAL OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Patents, etc.) Date considered Examiner 10-31-05 T. M. Thomas EXAMINER: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

APR 1 4 2005 Sheet I of 5 File No. U.S. DEPARTMENT OF COMMERCE Serial No. PATENT AND TRADEMARK OFFICE FIS920040194US1 10/711,897 INFORMATION DISCLOSURE STATEMENT BY APPLICANT Applicant(s): (Use several sheets if necessary) HAINING YANG, ET AL. Group: 28<u>22</u> Filing Date: 10-12-04 U.S. PATENT DOCUMENTS EXAMINER DOCUMENT INITIAL NUMBER FILING DATE IP DATE NAMB CLASS SUBCLASS APPROPRIATE 4,851,370 07/25/1989 Doldan et al. 437 -225 12/28/1987-2 5,506,169 04/09/19967 -Guldi-437-<del>70</del>-<del>-10/20/1994</del> · 3 <del>07/23/1996</del>, -5,538,916-Kuroi et al. 437 72 04/20/1994 4 5,580,815 12/03/1996 - Hau et al. 437 <del>49</del>-02/22/1994 5,620,919 04/15/1997- Godinho et al-438 230 03/30/1995 6 <del>-5,633,552</del>-05/27/1997 Loo et al-<del>310</del> 311-<del>07/10/1994</del>~ 5,668,403 -09/16/1997 Kunikiye 257-<del>-639</del>-09/03/1996~ 8 <del>5,707,889</del> 01/13/1998 - Hou et al. 437 69-05/13/1996 9 -5,891,798· 04/06/1999 Doyle et al 438 624 12/20/1996. 10 5,908,312 <del>-06/01/1999 -</del> Cheung et al. 438 287 <del>05/28/1997</del> 11 5,985,737. 11/16/1999~ Wu 438-448 03/04/100R U.S. PATENT APPLICATION PUBLICATIONS EXAMINER DOCUMENT ENTRAL FILING DATE IF NUMBER DATE NAME CLASS SUBCLASS APPROPRIATE FOREIGN PATENT DOCUMENTS EXAMINER DOCUMENT INITIAL NUMBER FILING DATE IF DATE COUNTRY CLASS SUBCLASS APPROPRIATE OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Patents, etc.) Examiner Date considered T. M. Thomas

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